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ABSTRACT

This teaching guide for students in grades K-4 provides suggestions for 2 class periods of instruction related to recreational use of water areas. Some supplementary language arts activities and a suggested book list are also included. (RH)

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WATER FOR FUN

A Learning Experience for
Coastal and Oceanic
Awareness Studies

Produced by

MARINE ENVIRONMENT CURRICULUM STUDY
MARINE ADVISORY SERVICE
UNIVERSITY OF DELAWARE

and

POPULATION-ENVIRONMENT CURRICULUM STUDY
COLLEGE OF EDUCATION
UNIVERSITY OF DELAWARE

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Please send evaluations

of learning experiences

to

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TITLE: WATER FOR FUN

* CONCEPT: V.B.2.b.(3)(a)

V. The activities of human populations may degrade the environment and restrict the quality of human life.

B. Human activities cause pollution.

2. Pollution reduces the quality and usefulness of the environment.

b. Reduced water quality affects many human activities.

(3) Many recreational activities are related to water

(a) PEOPLE ENJOY BOATING, FISHING, AND SWIMMING.

** MARINE CONCEPT: 4.22

4. Man is part of the marine ecosystem.

4.2 Man's activities may deplete and degrade marine ecosystems.

4.22 MAN IS CHANGING MARINE ECOSYSTEMS BY ADDING POLLUTANTS TO THE AIR AND WATER.

GRADE LEVEL: K-4

SUBJECTS: Social Studies, Science

CLASS PERIODS: 1-2

AUTHOR: Murray

BACKGROUND: There are many outdoor recreational activities dependent upon water. Swimming, fishing, boating, surfing, and water skiing would not be possible without water. The proximity of attractive bodies of water enhances the recreational potential of land for camping, hiking, and nature trails.

According to the National Recreation Survey of 1962, the following percentages of the U.S. population engaged in water-related activities in 1960:

Swimming	45.0 %	Boating (other)	22.0%
Sailing	0.12%	Water skiing	6.0%
Canoeing	0.11%	Fishing	29.0%

The changes in the life styles, work habits, and income since 1960 have resulted in even larger numbers of the American public using water recreational facilities.

The quality of the water, including the amount of pollution, appearance, odor, and rate of flow are among the factors that determine whether or not it is usable for recreation. Many bodies of water in this country and the world are in danger of becoming unusable for recreation because of the deteriorating quality of the water and its adjacent land.

In and around cities, there are large concentrations of people and industry requiring such services as waste treatment and electricity. Often these utilities cannot accommodate the demand. It is then that chemicals and untreated sewage are dumped into the waterways. The chemicals affect the water bodies by killing many of the organisms living there.

* From A Conceptual Scheme for Population-Environment Studies, 1973. Cost $2.50.

** From Marine Environment Proposed Conceptual Scheme, 1973. No charge.

Both conceptual schemes are available from Robert W. Stegner, Population-Environment Curriculum Study, 310 Willard Hall, University of Delaware, Newark, DE 19711.

R 176

The bacteria which normally live in water increase in number in response to the organic material in untreated sewage. They act to decompose the sewage and, in the process, utilize much of the dissolved oxygen in the water. The condition of high organic content and low oxygen content is known as eutrophication. The bacterial population also increases due to the tremendous amounts of bacteria contained in human wastes. Thus, the bacteria in water have two detrimental effects: 1) they consume a great deal of oxygen during eutrophication so that other organisms are deprived of the oxygen they need to exist and 2) they cause a dangerous health hazard to both humans and wildlife as a result of a high coliform bacterial count.

Industries and electric power plants often require water as a coolant. In the cooling process, water which is usually taken from lakes, rivers, and estuaries is warmed and returned to the body of water from which it came. Many of the organisms cannot tolerate these temperature increases and die.

Oil is being used today in tremendous quantities. In order to get more of this needed resource, new drill sites are being investigated. Some of these proposed sites are in the Atlantic Ocean, directly off the East Coast of the United States. If there were to be a drilling disaster, such as the one in Santa Barbara in 1969, the Atlantic beaches would be covered with oil, severely limiting recreational activities. Much oil is also being transported in ships which pass through waterways near recreational areas. In the process of ship loading, transport, and unloading, large amounts of oil are spilled. This spilled oil, usually concentrated in port areas where refineries are located, also can adversely affect the wildlife and recreational potential of an area.

Water pollution is not limited to highly populated areas. Many rural farm areas, such as southern Delaware, use chemicals, fertilizers, insecticides, and herbicides which, through rain runoff, are carried to streams, lakes, estuaries, and coastal waters. In these areas, wastes from both humans and livestock are often not treated and also run off into surrounding water bodies. The chemicals, insecticides, and herbicides can be toxic to organisms, thus upsetting the ecological balance. Fertilizers promote the growth of aquatic plants in large numbers. When these plants die, eutrophication occurs.

Erosion of soil from rain and running water is a natural process, but its rate is increased by human activities such as deforestation and improper farming techniques. The silt that is formed from the erosion of soil can fill up and thus reduce the lifespan of a body of water. The silt can also cover the food supply and nesting areas of fish and shellfish.

As more people participate in water recreation, there is a rapid development of recreational areas, which results in a sharp increase in pollution. Often land development occurs so rapidly that there is little thought given to improved waste treatment facilities or the ecological effects of homesite building. For instance, many vacation homes in southern Delaware are being built on tide marshes, areas of high biological richness and sensitivity to environmental disturbances, with little consideration for the environmental impact.

What can be done to conserve our water resources? Most importantly, people should become aware of the pollution problem. This knowledge would serve a twofold purpose: people would be more conscious of their effect on the environment and they would be able to work with public officials to improve municipal pollution control facilities and to plan for future population growth and the resultant increase in pollution. Also, more scientific research should be supported to develop better pollution control facilities, alternative forms of energy, and to investigate the environmental consequences of pollutants. Finally, laws can be enacted to ban the more deleterious pollutants. Of the pollutants not banned, the laws could

limit the amounts and locations of their disposal.

It must be realized, however, that many industries, farms and utilities which contribute to water pollution are of great economic importance to the country. Thus a compromise must be reached which allows for maximum protection of the environment compatible with economic and industrial growth.

LESSON:

Objectives:

1. To bring about awareness of the importance of water for recreation.

2. To increase understanding of the kinds of recreation which need clean bodies of water.

3. To encourage active concern about the marine environment.

4. To increase understanding of the causes of water pollution and the effects of this pollution on water-related recreation.

Procedures:

1. Present students with maps of their state or ask them to bring one from home. (These can be road maps from oil companies or the official highway map from the State Department of Highways.)

2. Ask students to identify bodies of water on the map (in blue).

3. Ask them to identify places that they know on the map. One student and the teacher can lead the activity with a map that all can see and compare with their individual maps.

4. Have pupils locate bodies of water they have visited and tell what they did there. The discussions should bring out the fact that most bodies of water are visited for recreation purposes. Fishing, swimming, boating, water skiing, and others will be mentioned.

   In October, 1970, the Delaware Planning Office prepared an outdoor recreation plan. It contains many maps, statistics, and much information on Delaware's outdoor recreational facilities and may be a useful supplement to this learning experience. Copies are available for loan from the Population-Environment Curriculum Study Office, 310 Willard Hall, University of Delaware, Newark, DE, 19711 (302) 738-2184.

5. Show pictures of water recreation. Examples are:

   Ranger Rick's Nature Magazine

   July 1970 - cover
   Nov. 1970 - p.7 (canoeing)
   Jan. 1970 - p. 17 (ice fishing)
   Dec. 1970 - p. 20 (nature walk)
   Aug./Sept. 1969 - p. 27 (kayak boating)

Many of the nature and conservation magazines will have good pictures for this purpose.

6. Ask the students to describe how the water looks in these pictures.

7. What things pollute the water (make the water dirty and unusable)? It is important that the student understand as many of the causes described in the teacher background as his level of comprehension permits. In this way, the student will become aware of man's detrimental effect on the environment.

8. Show pictures of polluted waterways and compare these to the pictures from #5. Examples are in the National Geographic Magazine:

   June 1971 - p. 866
   Dec. 1970 - p. 738

   Also many of the weekly news magazines, such as Time and Newsweek, from the early 1970's have good pictures for this purpose.

9. Ask the students whether they have ever gone to a beach only to find that swimming was not allowed. Why do they suppose this could happen? Answers may include health and aesthetic reasons: the water is not pretty; it smells; it has garbage or chemicals in it; it has oil in it; the bacterial count is high.

10. What part do people play in pollution? (more people, more pollution)

11. Can you foresee the possibility of public swimming areas being limited to a set number of people per day? Why?

12. Find out the population of New Castle County and determine 50% (half) of this figure. What would happen if 50% of the population of New Castle County decided to go to Lums Pond all at once on a summer Sunday?

13. What can we do to limit the pollution of the marine environment?

Additional Activities:

1. Draw a large outline of your state on 4' by 6' paper. Have committees of children place symbols for recreation on the water areas. They may draw their own pictures of boats, swimmers, fishermen, fish, clams, oysters, etc.

2. Give each student a copy of the enclosed "Blue Water Bay" map and pollution factors cutout sheet (pp. 6, 7, 8)

   a. Have the students color the pollution factor symbols with colored pencils and cut out the squares.
   b. Have the students place the boat, surfer, and fishing rod cutouts wherever they think they might be found.
   c. For every four of the above cutouts that they place on the water, they must also put one gas pump, garbage can, and car in appropriate places. For every six of the above cutouts, they must put one farm and factory in appropriate places.
   d. Ask the students what they have found out by using the "Blue Water Bay" map.

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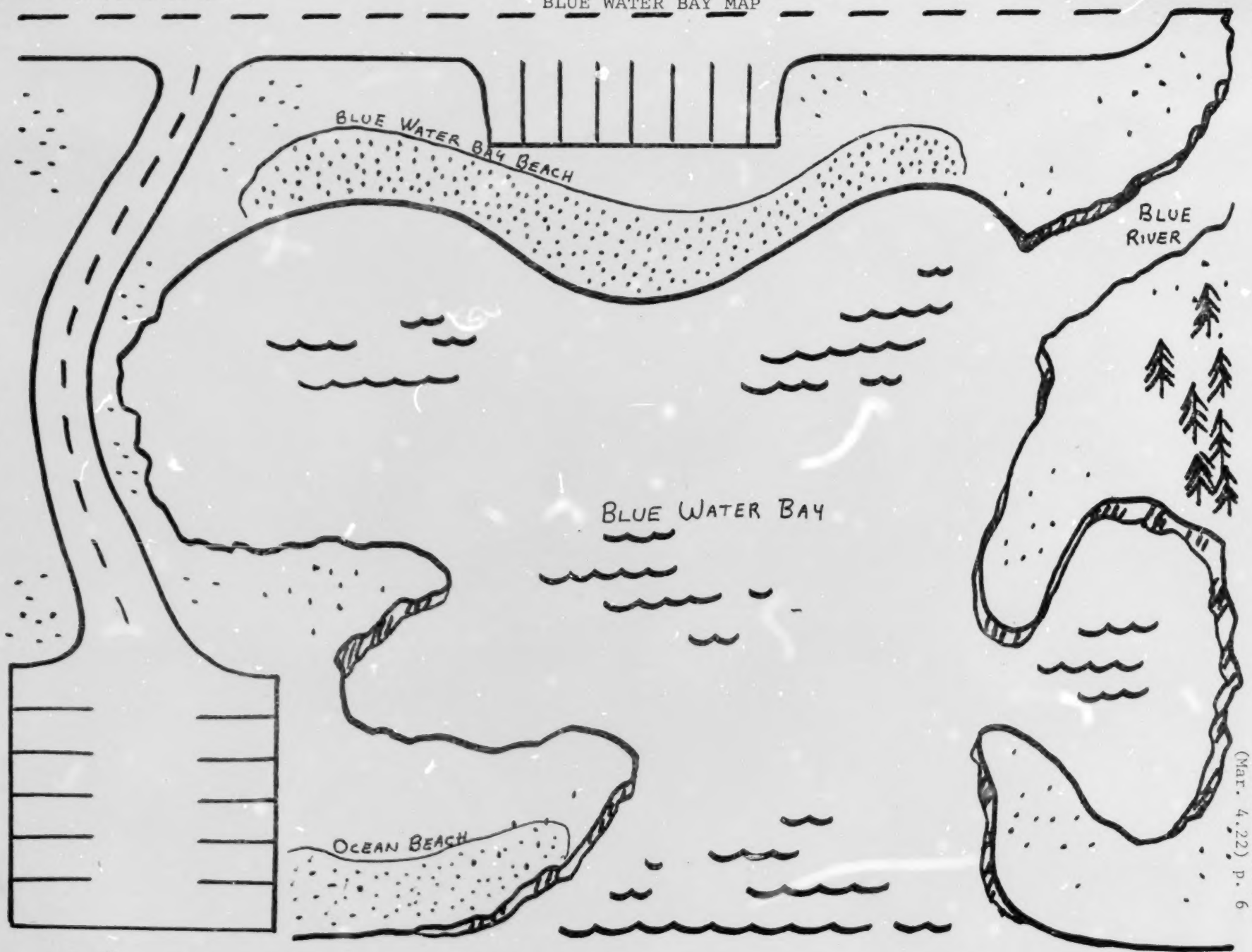
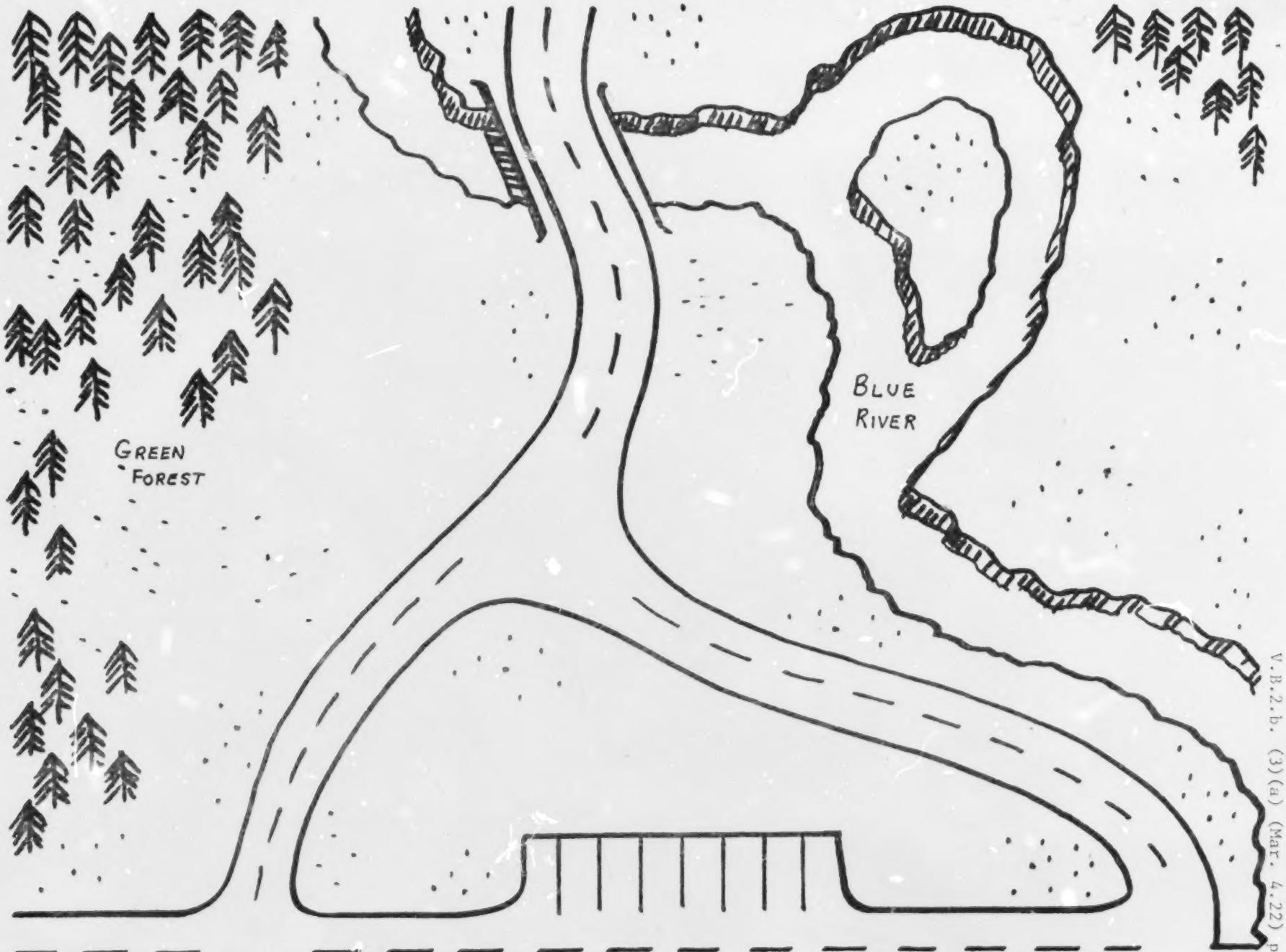
CONTINUED ON PAGE 7

BLUE WATER BAY MAP



V.B.2.b. (3)(a)
(Mar. 4.22) p. 6



BLUE WATER BAY MAP

V.B.2.b.(3)(a)
(Mar. 4.22) p. 8
POLLUTION FACTORS
CUTOUT SHEET

13

14

Language Arts Activities Supplement

#104 WATER FOR FUN

Unit Overview: The recreational uses of water and the manner in which pollutants affect these uses are investigated. The unit includes activities such as viewing and naming bodies of water on maps, learning how bodies of water are used and what pollutes them, and making and labelling maps.

Grades 1-3

Pocket Full of Syllables--Learning Center (or board activity)

Objective: To have the child recognize one-, two-, and three-syllable words and to follow written directions.

Materials: Index cards with one-, two-, and three-syllable words from the "Water for Fun" learning experience written on them

A large poster or bulletin board with four pockets on it, labeled "1", "2", "3", and "Word Cards".

Answer card at teacher's desk

Procedure: Put the following directions on the learning center and go over them with the class.

1. Take the cards out of the Word Cards pocket.
2. Read the word on the first card.
3. If the word has one syllable, put it in the pocket with the #1 on it.
   If the word has two syllables, put it in the pocket with the #2 on it.
   If the word has three syllables, put it in the pocket with the #3 on it.
4. Do the same for each word card.
5. When finished, get the answer card from my desk.
6. Check the words from pocket #1 and see if they match list #1 on the answer card. Do the same for pockets #2 and #3.
7. Did you put them all in the correct pockets?
8. Now mix the cards up and return them to the Word Card pocket.
9. Next, return the answer card to my desk.
10. Thank you.

Suggested words:

One syllable	Two syllables	Three syllables
rain	killing	chemicals
clean	fishing	industry
oil	nature	canoeing
spill	protect	pollution
swim	water	erosion
sail	garbage	factory

#104 WATER FOR FUN (cont.)

Grades 1-3

Sentence Making--Learning Center

Objective: To help develop good sentence structure

Materials: Five small "category" boxes or cans to hold cards

List of words or phrases lettered on cards

Paper, pencils, crayons

A corner or area where learning center can be set up

Procedure: Put the following directions in the learning center and go over them with the class.

1. Choose a card from each category box.
2. Put the cards together to make a sentence.
3. Copy the sentence you made.
4. Draw a picture to go with the sentence.
5. Write your name on your work.
6. Pin your work up if you wish.

Suggested words and phrases:

Category 1	Category 2	Category 3	Category 4	Category 5
The beautiful	duck	jumped up	quickly	in the car.
The funny	dog	floated	slowly	on the mountain.
The wise	crab	leaped	nicely	in the woods.
The thoughtful	butterfly	hobbled	beautifully	in the ocean.
The silly	godmother	yelled	eagerly	in the corner.
The cheerful	king	slept	sadly	in the classroom.
The ungrateful	teacher	smiled	gleefully	over the curb.
The frisky	magician	ran	roughly	up the street.
The yellow	shark	crawled	noisily	at the store.
The black	scientist	stumbled	recklessly	through the tunnel.
The spotted	clam	wiggled	doubtfully	at the beach.
The wicked	rabbit	shook	carefully	on the leaf.
The ugly	monkey	swam	happily	under the bed.
The clever	fish	skipped	gracefully	across the lake.

#104 WATER FOR FUN (cont.)

SUGGESTED BOOK LIST

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